

Introduction

Computers and the Internet have mesmerized the American education system. More and more, educators are integrating the Internet in their classrooms and curricula. Understanding the influence of childhood education on general lifestyle choices, it only makes sense that society should reflect upon and critically analyze the potential effects of any new educational trend.

This essay will engage in a critical discussion of the role of computers and the Internet in education. We argue that caution needs to be taken when implementing computers and the Internet as a teaching tool due to its counterproductive influence on community efforts to solve complex social issues. First, we will examine what purpose education serves in American society. Then we will explore the positive and negative aspects of using computers and the Internet in education. Finally, we will use global climate change as a case study in order to illuminate the manner in which educational use of computers and the Internet impact community-based efforts.

Education and Citizenry

While education serves innumerable ends, most Americans share a common conception of what the purpose of education is and should be. "In the end," says educator Howard Gardner, "education has to do with fashioning certain kinds of individuals—the kinds of persons I (and others) desire the young of the world to become... I crave human beings who understand the world, who gain sustenance from such understanding, and who want—ardently, perennially—to alter it for the better" (Gardner, 2000, p. 19-20). Education has to do with creating citizens who involve themselves in the world and who are able to understand and communicate through their communities' different cultural literacies.

Gardner's view encapsulates American ideology concerning education, which originates from Plato's dialogues, especially those discussing truth, beauty, and goodness. These virtues are important because they help individuals to determine how the world is and how it should be. Coming to conclusions about truth, beauty, and goodness in the world moves us toward the individual and community-based actions that help "to alter it for the better" (Gardner, 2000, p. 19).

Our education system has also internalized Plato's dialectic method to come to these conclusions. In his dialogues, Plato uses question / answer interactions between Socrates and citizen-passers-by to help both his characters and his readers intuit the nature and importance of the virtues. Thus, dialogue does more than simply create discussion about the virtues. It *reveals* the virtues. The push for teachers to help their students interact with learning material springs from the interactions between Socrates and the citizens. The back and forth with others or with a text that dialogue creates not only engages students, but also it effectively develops and internalizes the critical thinking and analytical skills students need to become involved, informed public citizens (Gardner, 2000, p. 36). More important than the answers students come to is the dialectic process by which they reach them.

According to Plato's student Aristotle, two important elements of this process are self-discipline and experience. Self-discipline, Aristotle believed, comes out of self-

investment and involvement with subjects, and experience from living and acting¹. When discipline and experience are brought to the dialectic process, it most assuredly leads individuals towards developing the character necessary to become an involved, informed public citizen.

The Greeks also held a holistic view of education; that is, "one attempted to achieve excellence in all things, continued to strive throughout life, and sought, as well, to be an integrated and balanced human being." Thus, in the Classical—and into the Medieval—Era, students learned mastery in many areas: music, poetry, gymnastics, riding, marksmanship, rhetoric, measuring, medicine, astronomy... (Gardner, 2000, p. 34). Our current educational system strives to incorporate a broad spectrum of areas in primary and secondary education, but at the level of higher education, it has become focused on disciplines. Because the level of detail in each area of knowledge has since surpassed that of Plato and Aristotle's time, we have separated subjects. Students, today, become masters in particular disciplines rather than in all areas.

When we made an educational shift from a holistic approach to a disciplinary one, we still retained the Greek philosophers' mission: to create public citizens who serve for the betterment of their communities. Each disciplinary master is a public citizen—a participant—who contributes to the future goals we set and decisions we make as a community. Each disciplinary master has been prepared through education to join his fellow masters in "the task of renewing the common world" (Ardent, 1961, p. 196). If, today, we are leaving by the wayside education's primary task to create public citizenry, it is not, it seems, because we have rejected this task. It is rather because we have departed from the dialectic method, diverted our focus to the modern-day advances of knowledge, and in our fascination with technology forgotten education's task².

Computers and the Internet in Education

The debate regarding computer and Internet³ use in the classroom seems to have reached an impasse. Not only is there disparity among the results of different studies

¹ Aristotle says that happiness is the chief good, the thing that all men aim to attain (*Nicomachean Ethics*, Bk. 1, Ch. 1, section 1094 lines 1-4). For Aristotle, happiness is a virtuous activity of the soul, and is permanent because when one continuously engages in virtuous activity and contemplation, he intuitively realizes what is good. Thus, good citizens result from virtuous activity—i.e., disciplined activity. Moreover, encountering life experiences as one grows older helps one to implement his virtuous activity. That is why "...there is required [for happiness]...not only complete virtue but also a complete life..." (Bk. 9, Ch. 9, 1099 lines 25-26 and 1100 lines 4-6).

² Maxine Greene, in her introduction to *Releasing the Imagination*, writes "Now, with so many traditional narratives being rejected or disrupted, with so many new and contesting versions of what our common world should be, we cannot assume that there is any longer a consensus about what is valuable and useful and what ought to be taught, despite all the official definitions of necessary outcomes and desired goals" (Greene, 1995, p. 3). Greene is pointing to the deterioration of cohesion in our communities and our increasingly individualized goals. These phenomena, we argue in this essay, are in part a result of new technologies—in particular computers and the Internet—which encourage individualization, distance people from communities, and mesmerize our society to the extent that we forget "what is valuable and useful and what ought to be taught."

³ This paper treats computers and the Internet as tools of the same nature. Therefore, in describing the positive and negative aspects of computer-use in education, we also mean to address the positive and negative aspects of Internet-use. For this reason, the phrase "information and communications technology" shall be adopted to encompass both computers and the Internet.

conducted on the effectiveness of their applications in education, but also there is disparity among teachers' experiences with integrating computers into their curricula. Adela Najarro, a third-grade bilingual teacher at Sanchez Elementary School in San Francisco, is "a true believer" in the teaching power of computers and the Internet, while just down the hall her colleague, bilingual teacher Rose Marie Ortiz, has reservations about the practicality of computers in her second-fourth grade special-ed class: " 'These kids still need the hands-on,' [Ortiz said]—meaning the opportunity to manipulate physical objects. . .," an opportunity that computers simply cannot provide (Oppenheimer, 1997, p. 8-9). Added to the equation is the increasing pressure to integrate computers into curricula that educators are feeling from business and political leaders who tout computer-skills as the most essential, most marketable skills required for survival in the "real-world" (Oppenheimer, 1997, p. 4).

But "real-world," technology-based education seems to be leading kids further and further from what has till now been regarded as the fundamental goal of education: to give children the critical thinking and analytical skills necessary to enable them to become healthy, functional members of American society. Although in some cases the advantages of educational computer / curriculum integration can be argued to outweigh the disadvantages, the degree of computer implementation that political and business leaders call for results in an over-reliance on information and communication technology (ICT) that fails to imbue students with critical thinking and analytical skills. Thus, ICT use in the classroom loses its value and defeats the fundamental goal of education.

In his book, *Let Them Eat Data*, C.A. Bowers lists several typical reasons to be wary of computers in the classroom:

1) Computers limit students' imagination; 2) computer advocates overstate the connection between data and thinking; 3) students often have only a superficial understanding of the information they download; 4) computers frequently break down; 5) underfunded schools have less access to computers and thus put already disenfranchised students at a further disadvantage; 6) computer-based learning has negative physical side effects that we are just beginning to understand. (2000, p. 113)

But even Bower calls these criticisms "partly valid." As further research and funding goes into computer technology development and the role of the computer in the classroom, scientists, politicians, and now many educators easily refute these anti-computer arguments. *Communications and Networking in Education: Learning in a Networked Society*—a collection of talks and papers produced for the 1999 Open Conference of Communications and Networking in Education in Aulanko, Finland—points to an integrated computer/curriculum classroom. In the paper "Creativity, visual literacy, and information communications technology," Avril Loveless writes, "Visual literacy plays a key role in our ability to decode and encode meanings, both to establish communication and to express our ideas to others" (Loveless, 2000, p. 52). For Loveless, visual literacy is intimately bound up with ICT because it is through this medium that our modern society communicates.

Loveless's main argument is that the Internet and computers enable students to "explore visual ideas, try things out, and re-work without the discouragement of 'spoiling'[their ideas]" The kind of creativity afforded by computers and the Internet, she

feels, is invaluable and irreplaceable. Students can save ideas, recall them, delete them, combine them, extend them, interact with them, and send them to others (Loveless, 2000, p. 53). Loveless cites two case studies to emphasize her point, both conducted in Brighton, UK. The Brighton Media Arts Project brought the artist Terry Taylor into the classroom to discuss themes of difference between the natural and the manufactured. As students began to construct their own images in order to engage with Taylor's themes, ICT allowed students to grasp abstract ideas through interacting with them on the screen. Students could evolve these ideas further by mutating their images, superimposing them upon one another, or constructing them with other students.

The second case study—The Brighton Internet Project—set up communications between two groups of six-year-olds through the Internet to communicate art ideas with each other. Over space and time, Taylor asked each group to evaluate the other group's computer art—those images which the students had constructed through computer tools in their own classrooms. Through email exchanges, students developed and completed images that were sent to them. The Internet not only allowed fast, informal communication, but also it enabled the exchange of ideas between two groups who would otherwise have never had the opportunity to interact with each other, especially in such an involved manner.

These case studies at some level refute the criticism that computers inhibit students' creativity. According to Loveless, because the Brighton students worked with ICT, whose tools allowed them to express their ideas in new forms, the students entered into a "dialogue between themselves and the images they were making" (Loveless, 2000, p. 55). Dialogue, in Loveless's and Taylor's view, is the "working method through which meaning resolves itself" (Loveless, 51). If education's aim is to give students the tools to "decode and encode" meaning, then what more appropriate, more convenient and more varied tool than ICT to accomplish the task?

Critiques of computers and the Internet, however, call into question the quality of dialogue that ICT encourages. Even Loveless is concerned with how students engage with computers.

Easy access to information does not automatically lead to learning...
Even when children have access to technology which enables them to make, save and display visual work, they often find themselves producing visual images or animations which are incomplete and lack an audience for the presentation, development or exhibition of work. (Loveless, 2000, p. 52-53)⁴

The crucial element, then, is the educator, who must understand not only how ICT operates, but also how children relate to this medium at home, as well as in the classroom. It is the educator's responsibility to mold ICT into opportunities for children to develop analytical, critical, and creative aptitudes. It is the educator who must create the arena for proper dialogue between ICT and students.

To ensure proper dialogue, Kennewell et al write, "an evaluation [of computer-based educational activities] must be sufficiently open-ended to unravel *what* is being learned and *where* the learning is located" (Kennewell, Tanner, & Parkinson, 2000, p.130; emphasis in text). That is, the environment in which ICT is used must be included

⁴ Loveless paraphrases J. Sefton-Green and D. Buckingham in "Digital Visions: Children's "creative" uses of multimedia technologies" in *Digital Diversions*, (London: UCL Press, 1998).

in the learning dialogue. Kennewell et al give the example of a Roman life simulation game in which students are asked to role-play as Roman citizens. The game requires students to make decisions about how to provide for their Roman families, how to carry out trades with other citizens, and how to find shops for the services they desire. The proper learning environment, Kennewell et al say, is created when two or three students are working together at the computer to discuss and evaluate the decisions they are making. Moreover, the teacher should intervene to press students to describe the actions they are undertaking and the intentions they are forming for future actions. In this situation, the teacher creates the framework for interaction with the ICT learning tool and thus, the dialogue through which students can learn.

The problem arises as classrooms begin to depend too much on ICT for learning and communication. Bowers notes this dependence in the rapid increase of computers in public schools—twenty-five students to a computer in 1989 compared to ten students in 1997. In a Denver Post article, Mike Soraghan records the national average student to computer ratio in 1999 was 5.7 to 1 (1999, p. A-1). In addition, in higher education, email has become the choice mode of communication between students and professors, while search engines and virtual libraries are the choice mode of research. Students are opting for the convenience of on-line courses. Political leaders, as well, are pushing for computer-mediated learning as the basis of our educational system—for instance, President Clinton, who “made computers in public school classrooms an essential component to his ‘bridge to the twenty-first century’” (Bowers, 2000, p. 111-112). “It’s almost as if nothing worthwhile goes on in schools unless computers are involved,” write Alison Armstrong and Charles Casement in their book *The Child and the Machine: How Computers put our Children’s Education at Risk*.

The political and social emphasis on computer-use in classrooms pushes towards an over-reliance that trumps creativity and student interaction. When ICT becomes the sole medium of operation, other avenues for expression—whether it be theatre or music or pottery or poetry—are in danger of being left by the wayside. And while students are engaged with monitors, they do not engage with other students. Because of the excess of computer screens, teachers are having to “rethink their standard group-oriented approach in order to implement a more individualized approach to learning” (Bergen, 1999/2000, p. 116-118). Moreover, on-line “chats” are one-dimensional. Dialogues are not dialogues at all, but rather random words and cliché phrases piled one on top of another; replies need not refer to questions, questions need not be posed from thoughtful consideration.

Over-reliance on ICT is becoming evident in the education system. It is not only reflected in students who choose ICT time after time to express themselves rather than experimenting with other mediums. It is also seen in the “billions of dollars...diverted from roofing projects, libraries, and art programs to bring schools on-line” (McKenzie, 1999, p. 26). Following the lead of political and community leaders who encourage ICT before all other mediums, students, too, narrow their focus and build upon their intelligences solely through computers and the Internet.

This societal emphasis on ICT-attained knowledge leads to a tabulation of intelligence through data retention. Armstrong and Casement encapsulate the intelligence-data relationship in their description of a magazine advertisement for Microsoft Encarta which pictures the faces of two six-year-old girls and projects the

caption “Forget Goldilocks and the Three Bears, tell us about Sartre” (Armstrong and Casement, 2000, p. 62). Intelligence, here, is measured in the form of facts-known rather than through critical thinking skills, such as those which might extrapolate the nature and motivations of the characters in a folktale like “Goldilocks and the Three Bears.”

In this way, Microsoft advertisement promotes a sort of “Trivial Pursuit” culture, in which parents rush to enter their children in the race to gather the most trivia so that he or she can advance first to the finish line. But, while Microsoft’s advertisement might be conveying that computers enable an information-rich society, Internet websites seem to convey a different message: “Surfing the Internet is fraught with diversions and difficulties for the learner. For one thing, there is just too much to see... Children who have access to the vast and ever-growing body of information are more likely to be briefly dazzled, then confused by all the choices that confront them” (Armstrong and Casement, 2000, p. 113). In-depth and thorough information on the Net is hard to come by, Armstrong and Casement point out, whereas trivia facts are thriving and even unavoidable. In promoting the Internet as a knowledge tool, Microsoft, as well as American society, seems to promote trivia-intelligence—intelligence that requires little work—over the knowledge that comes from comprehensive examination of and involvement with a subject.

But if the problems of ICT can be overcome through educators who are knowledgeable about ICT and cautious when they implement it in their classrooms—as the proponents of ICT imply, then why do we hesitate to advocate ICT utilization in classrooms? The answer has less to do with the frequent malfunctions of computers or the inability of disenfranchised students to have access to computers than with the zealotry that politicians, researchers, and educators put forth in order to resolve these setbacks. Even if proper engagement with the Internet were taught in classrooms, even if students were able to distinguish reliable from unreliable Internet resources, even if educators were careful to balance ICT use with other teaching mediums, and even if all students and educators had equal access to high-quality computers, we should still hold ICT at a critical distance.

The reason for this reservation rests in the interplay between authority and identity that occurs through ICT. Bowers describes this interplay as a “lack of global perspective on the cultural-roots of our ecological crisis” (Bowers, 2000, p. 113). In other words, ICT takes no consideration of where people come from, who they are, and what their cultures feel are important. He is describing the authority of our Western attitude, which manifests on the Net in the large, mostly Western corporations who pump dollars into creating websites and controlling and owning search engines. This is the authority that, in some sense, owns our intelligence—what corporations put out there is what students are directed to and end up storing in their own “data reserves.” “Who owns the Internet?” asks Henry Giroux, author of several books and articles on teenage culture. “It is still about corporate culture, about making money...” (Anonymous, 2000, p. 8-13).

But authority is not only assumed by Western and Westernized corporations. It is also manifested in Western values themselves—consumer-oriented values—disseminated through the information that links Internet connections. These values are encapsulated by the free-market belief that claims everyone has an individual voice on the Internet so long as he can compete in the information game. But these values transform cultures—both

American and international—from community-oriented cultures into individualistic ones that tout, “every man for himself!” Under free-market ideology, authority is held by each competing, individual website, no matter how correct or incorrect or consumerized its information is. Advertisements on the Internet have as much place on the Internet as education-based material. As a result, even the most relevant, useful Internet information is forced to succumb to consumerization—whether by quarter-page advertisements or by sponsorship from large corporations that fund attractive web designs—in order to compete with other sites. Often, advertisements take up more of a web page than information does and in this way, carry just as much, if not more, authority than what is expressed by the rest of the page.

And since there are no regulations other than monetary ones for who can post what where, anyone who desires authority can attain it. For example, many magazine and journal publishers often hesitate to print student writing, but the Internet makes no discriminations. It may be argued that such indiscriminatio n is a blessing that enables students a more significant voice; however, publishers follow rigorous editing codes for approving printing to avoid misinformation from being communicated. When these codes are no longer relevant, students—or anyone else—need not be responsible for what information they convey.

Essentially, authority on the Internet manifests because of a lack of locality; no information is attached to a place or a person. It might be attached to the network, but the network itself cannot be pinpointed to a single place or person. Moreover, this authority relies on a lack of responsibility, not only for the accuracy of information put out there, but also for the identities assumed by that information. Without realizing it, students in classrooms ingest information from corporations assuming scientific identities, from advertising firms assuming professorial identities, from other students assuming specialist identities... the list goes on and on; identities are mutated, superimposed, and constructed over and over, not so differently than the images created by the Brighton Art Project.

And if the information “experts” on the Internet are not responsible for their identities, why should students be responsible for theirs? Students enter into an authority-identity game in which students are responsible for neither the identities nor the authorities they wish to assume. At the same time, they play this game without realizing authorities and identities are imposing upon them—directing them towards what they should think and how. In Finland, the mobile phone company Nokia attributed their sales success to their time spent studying children, who were able to pick up the new technology more quickly and teach their parents how to use it, convincing them of its necessity. But ceding children this “strange measure of authority” is not only manipulative, but also dangerous. “When a technology comes along that rewards people who are willing to chuck overboard their old selves for new ones, the people who aren’t much invested in their old selves have an edge. The things that get tossed overboard with a 12-year old self don’t seem like much to give up at the time” (Lewis, 2001, Magazine Section).

The detachment from responsibility, for one’s actions and one’s identity, transfers directly to education’s goal to help students become well-rounded citizens who are accountable for their actions. Responsibility, which involves care and self-discipline, is necessary for engaging with and fulfilling roles in the public arena. Without it, students

are likely to sidestep the identity-building process that occurs through education and experience—that process which helps students develop the character that allows them to function as individuals and members of a community. Thus, Loveless’s ICT-initiated dialogue fails on the most profound level to enable students to derive and express meaning—which is ultimately created and resides in a community-shared context and not within individuals in and of themselves.

Making the Leap from Using the Internet in Education to Global Warming

Global climate change is linked to a number of diverse problems; some of these include: sea level rise, deforestation, natural disasters (droughts, floods, heat waves, avalanches, hurricanes, and wind storms), water availability, food production, biodiversity loss, spread of disease (Houghton, 1997, p.135). Dealing with these climate change complexities involves scientists, technologists, politicians, industry members, economists, and individuals who “through the democratic process encourage local and national governments to deliver policies which properly take the environment into account” (Houghton, 230-234).

Thus, solutions to global climate change incorporate a spectrum of community-related issues. As the second Intergovernmental Panel on Climate Change “Summary for Policy Makers” points out, “The ability of human systems to adapt to and cope with climate change depends on such factors as wealth, technology, education, information, skills, infrastructure, access to resources, and management skills,” all factors that are controlled by and affect individuals and communities (2001, pg.8).

To address these factors, socially adept citizens, who are capable of respectful exchange, represent a necessary ingredient to global and community dialogue. Because education plays an integral role in creating public citizens, the character-developmental effects of ICT in education impacts students’ and thus, society’s ability to play a functional role in solving community problems. Transposing the advantages and disadvantages of ICT in education to the issues of global climate change illuminates these effects and demonstrates that more attention should be directed away from ICT use in education and toward the encouragement of community-engagement skills in students.

Admittedly, we recognize that there may be questions concerning the reality of human impacts on climate change, which is partly due the polarizing effect of the popular media. However, this essay is not intended to argue for or against the existence of anthropogenic climate change. Rather, it hinges on the fact that climate change, or any scenario similar to it, is a mammoth social issue that will require extensive global and community dialogue to resolve. For the purposes of this paper it will be assumed that anthropogenic climate change is a reality. If you find yourself incapable of going along with this assumption, feel free to mentally substitute other social problems, such as the limitation of natural resources, in place of global warming.

When it comes to studying global climate change, the Internet is an easily accessible, vast information resource. Just recently, during the international climate change policy talks in Bonn, Germany, *Eco*—the newsletter of the coalition of non-governmental organizations attending the talks—posted daily updates of the closed discussions on the Internet [www.igc.org/igc/gateway/enindex.html]. Additionally,

because the scientific insights and political issues surrounding global climate change are continuously evolving, the Internet can be used as a resource in searching for more recent general information about climate change. If information-seekers keep a discerning eye for unreliable and misinformed resources, the Internet is a useful way to keep oneself abreast of the global climate change debate.

The Internet thus takes on the role of an information conduit, which is used by responsible citizens who would keep themselves updated on the status of climate change anyway, be it through newspapers, books, or the Internet. But, the development of a responsible and involved citizen cannot be pinned on the long-term effects of using the Internet in education. Rather, the Internet only allows for the greater maximization of social skills which have already been acquired somewhere along the way.

The globalized learning community that the Internet provides also enhances global climate change discussions. Students can use the Internet to communicate with and understand the perspectives of cultures around the world. Not only does this make the complexity inherent in global issues apparent to students, but also it provides them with a channel through which dialogue concerning global issues can take place. But here again, the Internet does not necessarily instill in students the values which are conducive to involvement in public issues, rather, it provides an avenue through which one can greater pursue those already existent values. Additionally, as Bowers points out in *Let Them Eat Data*, Internet access is dismantling the structure of local communities, which could greatly disable the implementation of measures intended to counter the onset of global climate change.

As the Brighton Media Arts Project and the Brighton Internet Project illustrate, the Internet can be a unique and varied learning tool, it has the capability of helping an educator reach a greater spectrum of learning styles or interests in the classroom. Therefore, the Internet can be used to create greater depth and texture in lesson plans. However, this depth and texture is only achieved through a balance of all learning tools, not just emphasis on the Internet. When properly applying Internet in the classroom it can be viewed as an additional avenue through which a teacher can design lesson plans that serve to enhance the social development of students, which would in turn enhance community dialogue surrounding climate change.

Again, it should be noted that the Internet does not inherently have the ability to aid the development of students, but only achieves such potential through artful utilization by teachers. An article by Jamieson McKenzie, in the *PhiDelta Kappan*, illustrates this point by stating, "There is no credible evidence that networks improve student reading, math, or thinking skills unless they are put to the service of carefully crafted learning programs that show students how to interpret information and how to make up their own minds" (1998, p. 26-31). (It is interesting to note that the ability to interpret information and make decisions are skills that will play a central role in confronting complexities of climate change on a community level.) Despite the clear need for artful application of ICT, a large percentage of attitudes toward technology in education view it as the fix to educational problems. This is illustrated by the fact that school districts across the country are blindly investing dollars in computer technology without questioning if their money would be better spent on roofing projects, libraries, and art programs.

When not applied artfully in the classroom, the Internet can have potentially negative effects on the social development of youth, which will eventually impact the ability of a society to deal with complex public issues. As with any new technology or theory in education, the potential long-term influences should be considered before adoption takes place. One could argue the same for the introduction of new scientific technologies, such as genetic engineering. In the context of global climate change, the undesirable influences of Internet use in classrooms are significant.

Over-reliance on the Internet in classrooms reinforces the common social attitude that any new technology is inherently great. This point is noted in an article by Patrick B. O'Sullivan, "Many in American culture hold a 'technological determinism' view that sees technology as almost an independent, willful entity that imposes itself on human social dynamics." (Cole, 2000, p. 54). Turning to the Internet too often in American schools conveys the idea that technology leads our lives and is necessary in our lives. While it can be admitted that technology has accomplished wonderful things, one must question if a more cautious message should be sent to American youth about assessing the overall benefits of technology in the world. In dealing with complex social issues, such as climate change, the ability to critically assess all concerned social constructs, such as consumerization or individualism, is critical.

Certainly, allowing "technological determinism" to lead one's life is not all bad, especially when one considers the possibilities for energy efficient technology that are waiting just over the horizon. However, it can be admitted that the ability to articulately separate oneself from the institutions in one's life is going to play a key role in addressing problems like climate change. For example, a large part of resolving climate change will involve examining the technologies in our lives and how they translate into the consumption of natural resources. A likely way to counter the message of over-reliance on computer and the Internet, or any other technology, is to remind youth to think critically about how those technologies affect their lives.

Another potential drawback to over-reliance on the Internet in the classroom is laziness and lack of diversity in curriculum development. Many school systems hail computer technologies, the Internet being one of them, "as a 'technological fix' for low test scores and disappointing achievement levels" (O'Sullivan, 2000, p. 49). Caution should be taken in jumping to the conclusion that there is a miracle fix to our educational limitations. More than likely, remedying such problems is going to require effort on behalf of teachers and students. However, it seems possible that the temptation to turn to the Internet as an easy source for lesson plan ideas could result in less attention paid to building a classroom that incorporates methods that will develop social interaction and public engagement skills.

The laziness and lack of diversity that develop from ICT over-use correlates with how students will approach global climate change problems, whether they will be active and involved or detached, whether they will view global climate change issues from many perspectives or only one. For instance, while the making refined Internet searches saves students time, it does not require the patience and investment that searching through books or carrying a discussion do. The development of self-discipline and patience lost through laziness could greatly impact the public dialogue needed to address climate change. Without self-discipline there can be no investment in creating change; without patience there can be no compromise to integrate disparate viewpoints.

And the viewpoints that students develop about global climate change are closely related to the consumerization that is relayed through flashy Internet advertisements. The more a student is blinded by the economic system the harder it may be to understand that the consumptive nature of the system could be a partial cause of global warming. Furthermore, once a mindset is developed in youth, it is very hard to change. The over-consumption of natural resources proliferated by American consumerism is related to a number of global issues, such as deforestation, not just climate change.

In addition to consumerization, the Internet may reduce the amount of face-to-face social interaction between students. Admittedly, using the Internet does allow for a different type of social interaction with students on the other side of the world. However, this form of interaction is not nearly as personal because nonverbal communication is excluded from Internet correspondence. Larry Cuban, a professor of education at Stanford University, responds to this point by stating that the process of education is, “labor intensive-built on relationships-and is intended to convey values across generations. These are tasks that cannot be automated” (Soraghan, 1999, p. A-1). If the use of computers and the Internet in classrooms is disabling the formation of meaningful, face-to-face relationships, then there is reason to question the extent to which ICT classrooms can nurture a feeling of connection to the local community and shared values.

Additionally, less interactive communication becomes means less contact that youths have with actual living humans. There is some question as to whether using the Internet may reduce youth's sense of personal connection to a community and their ability to care for others. If a person is not capable of extending compassion to fellow humans, then they would be even less capable of tackling problems which extend beyond the human-realm, such as biodiversity loss. This inability to feel compassion for the natural world may pose challenges to overcoming the complexities of climate change.

Use of ICT allows educators to meet the needs of individual students', but it also moves away from student to student interaction. Such interaction can be highly valuable for the social development of youth, especially at a young age. If it is neglected, the ability and desire of youth to publicly engage themselves in the context of complex social problems may be weakened. The ability to think collectively and empathize with different points of view may be lost.

The ability to experiment with adolescent identities is touted as one of the benefits associated with Internet use among students. While it is admittedly healthy to seek out dreams and role models as a student, it is not necessarily healthy to be able to take on a new identity every day. It could be argued that such extreme identity flux does not allow a student to develop a strong sense a basic values and direction, without which it may be hard to assume a role in a community and feel a sense of responsibility toward a community.

Overall, there are good and bad impacts related to using the Internet in education. It can be easily agreed that the long-term impacts of using the Internet in such a manner should be critically assessed before going ahead with the new medium at full speed. The picture becomes even more interesting and insightful when one ponders how the effects of the Internet as an educational tool may alter attempts to deal with complex global issues, such as climate change. Ultimately, we need to ask ourselves what skills are going to be valuable in the future, or have always been valuable, and nurture them. It

cannot be denied that the caliber of global problems with which we are faced today are going to require the skills needed to publicly engage oneself.

Conclusion

Overall, our objective in this essay has not been to reject the use of ICT in classrooms. Certainly, computers and the Internet can benefit curriculums. However, it is crucial to be aware of the messages that use of computers and Internet convey to students. After all, “we know with certainty what common sense told us before: that computer use for a young child should be, at most, a small part of a complete nutritious diet of activity” (Pogue, 2001). If the American education system comes to a point of over-reliance on computers and the Internet, without teaching students to critically analyze Internet sources and enriching their education with diverse experiences, “we may raise a generation rich in data, facts, and information but lacking in wisdom” (McKenzie, 1998).

The purpose of our essay has been to question how the use of computers and Internet in education possibly impacts a person’s ability to engage in the complex social issues that confront humanity today. Global warming has served as an example of a complex social issue for the purposes of this paper. The benefits and drawbacks of using computers and the Internet in education were discussed. Following that, we explored how these benefits and drawbacks may influence social efforts to deal with global warming. The beneficial aspects of using ICT in education should not come before education’s goal to nurture healthy, functional citizens.

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